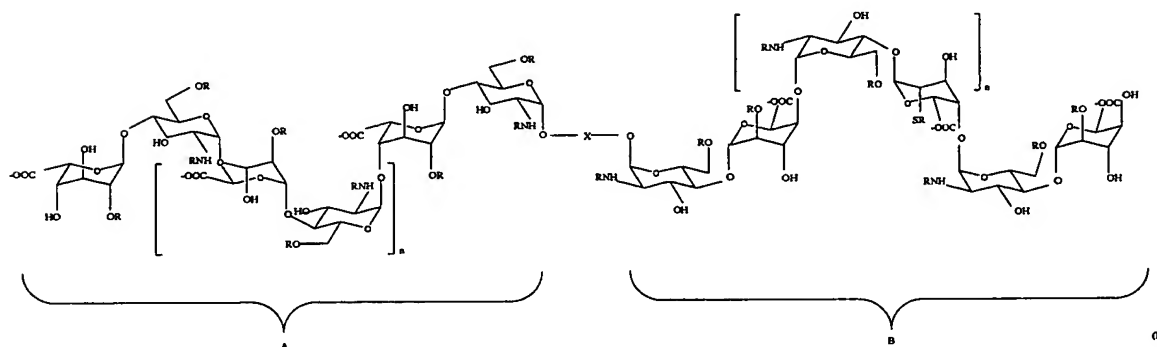


CLAIMS

1. Compound capable of binding to gamma-interferon ( $\gamma$ -IFN), chosen from the molecules corresponding to formula (I) below:

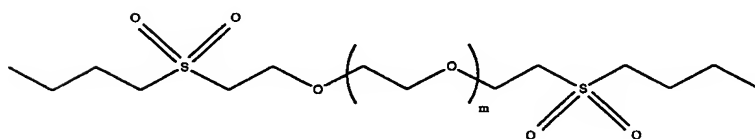


- in which X is a divalent spacer group that is sufficiently long to allow the two oligosaccharide fragments A and B to each bind to one of the peptide sequences 125 to 143 of the C-terminal ends of a  $\gamma$ -interferon ( $\gamma$ -IFN) homodimer, n represents an integer from 0 to 10, for example equal to 0, 1, 2, 3, 4 or 5, and each R independently represents a hydrogen atom, an  $\text{SO}_3^-$  group or a phosphate group, with the proviso that no  $\text{SO}_3^-$  group is in the 3-position of the glucosamine units of compound (I).

2. Compound according to Claim 1, in which all the R groups represent an  $\text{SO}_3^-$  group or all the R groups represent a phosphate group.
3. Compound according to Claim 1, in which the spacer group is 15 to 150 Å, preferably 33 to 50 Å, in

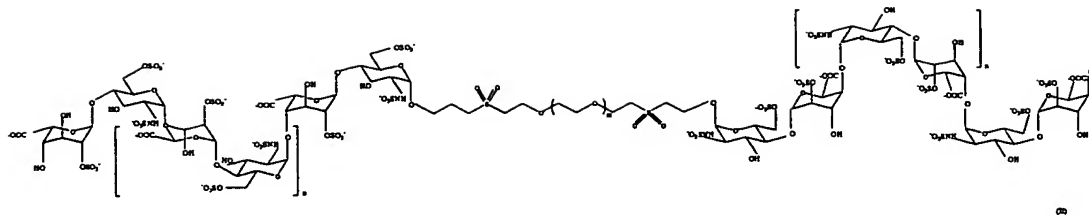
length.

4. Compound according to Claim 1, in which the spacer group consists of a carbon chain, preferably of 1 to 120 C, in which one or more of the carbon atoms are optionally replaced with a hetero atom chosen from N, S, P and O, an SO<sub>2</sub> group, or an aryl group, said carbon chain also optionally carrying one or more anionic groups.
5. Compound according to Claim 4, in which said anionic groups are chosen from sulphate groups, phosphate groups and carboxylic groups.
6. Compound according to Claim 4, in which the spacer group is derived from a polyglycol preferably chosen from poly(alkylene glycols) in which the alkylene group comprises from 1 to 4 C, such as poly(ethylene glycol).
7. Compound according to Claim 6, in which the spacer group corresponds to the formula:



in which  $m$  is an integer from 5 to 32.

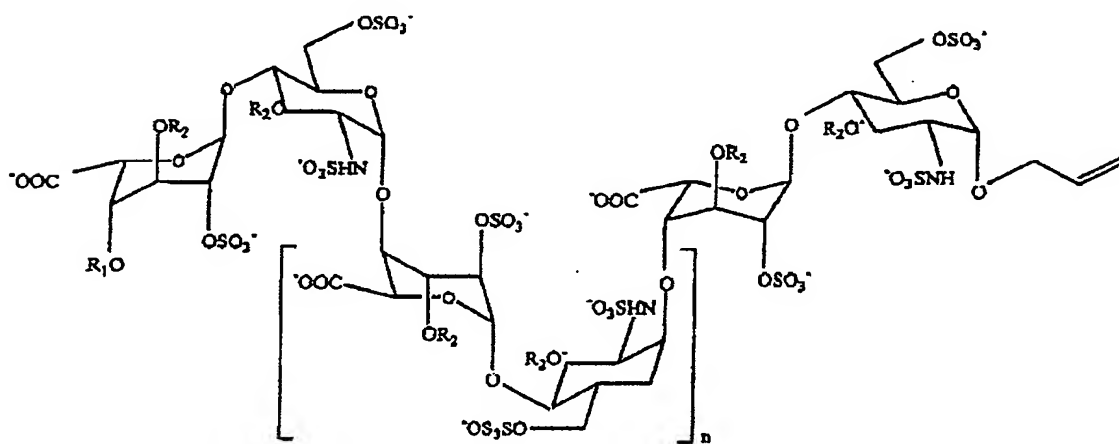
8. Compound according to Claim 7, corresponding to formula (II) below:



- 5            in which  $n$  represents an integer from 0 to 10, for  
example equal to 0, 1, 2, 3, 4 or 5, and  $m$  is an  
integer from 5 to 32.
9.        Compound (IIa) corresponding to formula (II)  
10        according to Claim 8, in which  $n = 0$  and  $m = 5$ .
10.       Compound (IIb) corresponding to formula (II)  
          according to Claim 8, in which  $n = 0$  and  $m = 10$ .
- 15        11.    Compound (IIc) corresponding to formula (II)  
          according to Claim 8, in which  $n = 0$  and  $m = 32$ .
12.       Compound (IId) corresponding to formula (II)  
          according to Claim 8, in which  $n = 1$  and  $m = 5$ .
- 20        13.    Compound (IIe) corresponding to formula (II),  
          according to Claim 8, in which  $n = 1$  and  $m = 10$ .
14.       Compound (IIf) corresponding to formula (II),  
25        according to Claim 8, in which  $n = 1$  and  $m = 32$ .
15.       Compound (IIg) corresponding to formula (II),  
          according to Claim 8, in which  $n = 2$  and  $m = 5$ .
- 30        16.    Compound (IIh) corresponding to formula (II),  
          according to Claim 8, in which  $n = 2$  and  $m = 10$ .

17. Compound (IIIi) corresponding to formula (II), according to Claim 8, in which  $n = 2$  and  $m = 32$ .

18. Process for preparing a compound capable of binding to gamma-interferon ( $\gamma$ -IFN) of formula (II) according to Claim 8, in which the free-radical coupling of two water-soluble compounds that are precursors of oligosaccharides of formula (III):

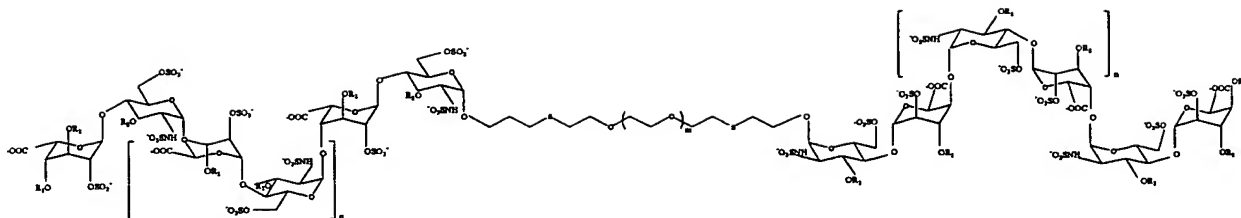


(III)

in which  $n$  is an integer from 0 to 10, for example equal to 0, 1, 2, 3, 4 or 5, and  $R_1$  and  $R_2$  represent a hydroxyl group-protecting group preferably chosen from *p*-methoxybenzyl and benzyl groups, with a dithiol compound that is a precursor of the spacer group of formula:

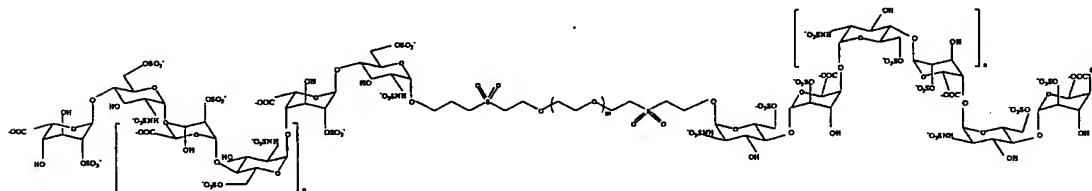


in which  $m$  is an integer from 5 to 32, is carried out so as to obtain a compound of formula (IV):



(IV)

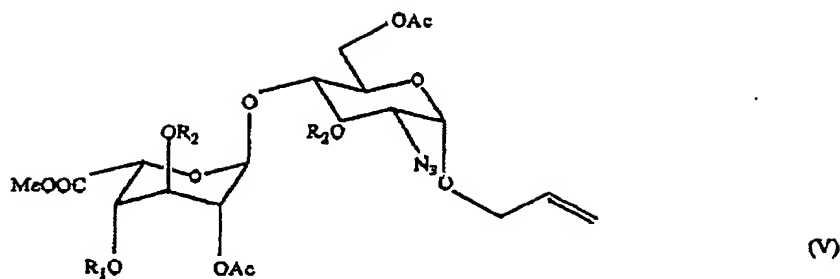
- 5 and then, the thioether functions are oxidized to sulphones and the final deprotection of compound (IV) is carried out so as to give the final compound of formula (II):



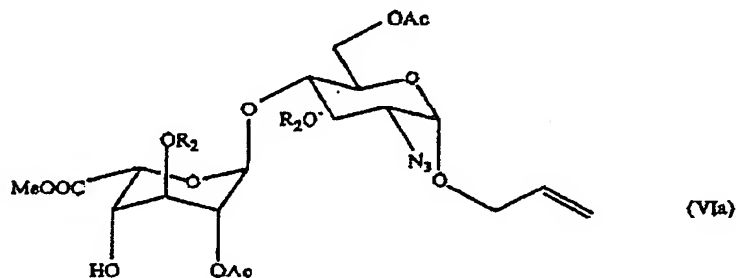
(II)

10

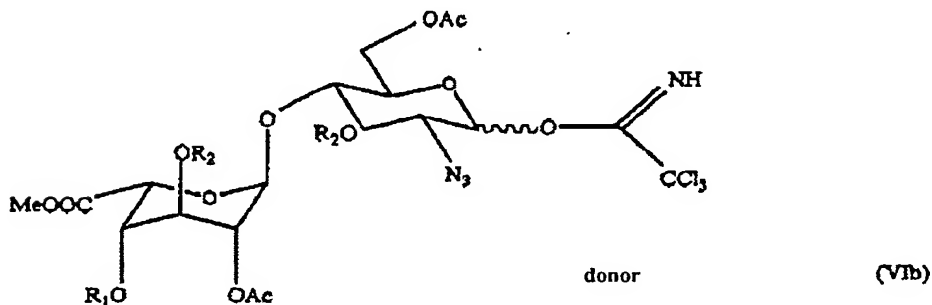
19. Process according to Claim 18, in which  $R_1$  is a p-methoxybenzyl group and  $R_2$  is a benzyl group.
- 15 20. Process according to Claim 18, in which the water-soluble compound that is a precursor of oligosaccharides of formula (III) is prepared by means of the following successive steps:
- 20 a) a disaccharide of formula (V):



is subjected to oxidative cleavage of the  $R_1$  group, preferably a para-methoxybenzyl group, so as to give an "acceptor" disaccharide of formula:

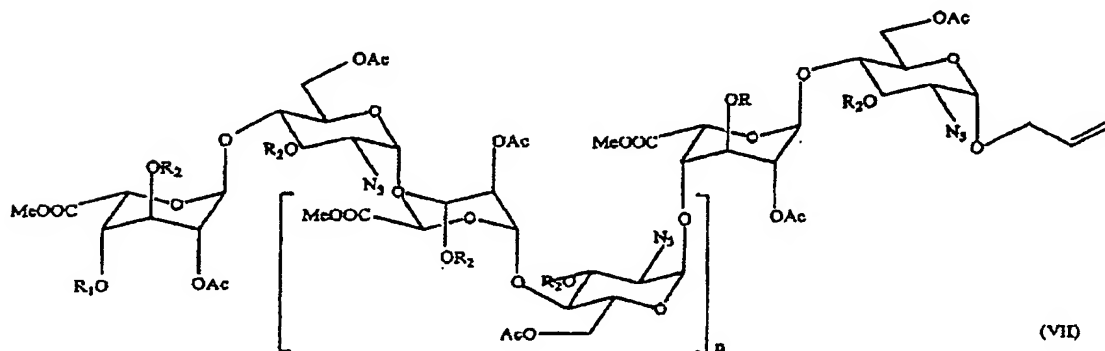


b) in parallel, a disaccharide of formula (V), above, is subjected to isomerization of the allyl group to 1-propenyl, followed by hydrolysis of the enol ether formed and activation of the hydroxyl group in the form of trichloroacetamide, so as to give a "donor" disaccharide of formula (VIb):



c) the acceptor disaccharide (VIa) and the donor disaccharide (VIb) are coupled so as to obtain the tetrasaccharide ( $n = 0$ ) of formula (VII), with an entirely alpha stereospecificity;

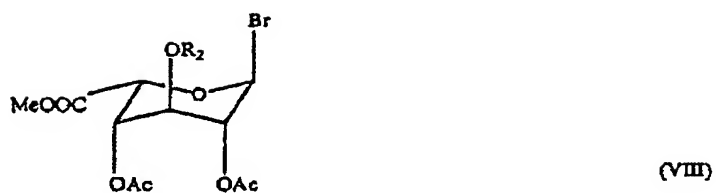
d) optionally, steps a) to c) are repeated, taking the tetrasaccharide prepared in c) as starting product for step a), so as to obtain the hexasaccharide ( $n = 1$ ) and octasaccharide ( $n = 2$ ) of formula (VII):



e) optionally, steps a) to c) are repeated, taking the octasaccharide prepared in d) as starting product for step a), so as to obtain a hexadecasaccharide ( $n = 7$ ) of formula (VII);

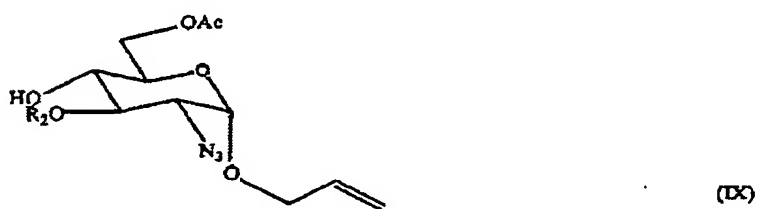
f) deacetylation, reduction of the azide function, sulphatation and saponification are carried out so as to obtain the desired water-soluble compound that is a precursor of an oligosaccharide (III).

21. Process according to Claim 20, in which the disaccharide of formula (V) is prepared by means of a coupling reaction between a compound of formula (VIII):

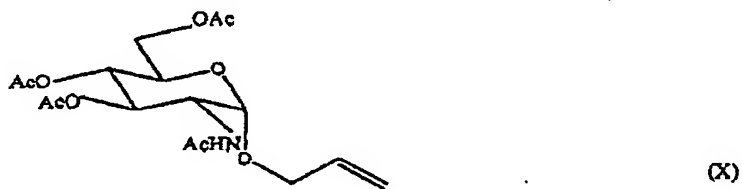


and a compound of formula (IX):

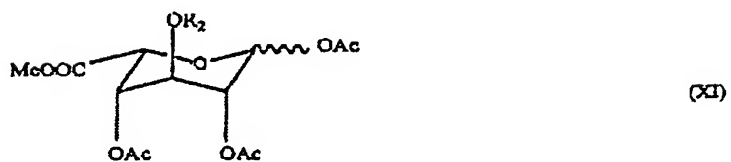
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22. Process according to Claim 21, in which the compound of formula (IX) is prepared from the compound of formula (X) and the compound of formula (VIII) is prepared from the compound of formula (XI):
- 10

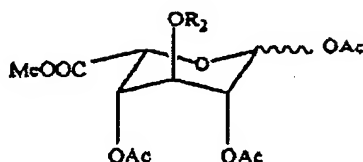


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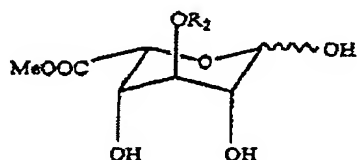


23. Process according to Claim 22, in which the compound of formula:



5

is prepared by acetylation of the compound of formula (XII):



10

at  $-40^{\circ}\text{C}$  in dichloromethane as solvent, with pyridine as base, acetyl chloride as acylating agent and, 4-dimethylaminopyridine as catalyst.

- 15 24. Compound according to any one of Claims 1 to 17, for use as a medicament.
25. Use of a compound according to any one of Claims 1 to 17, for preparing a medicament.
- 20 26. Compound according to any one of Claims 1 to 17, for use as a modulator, for example inhibitor, of the activity of endogenous or exogenous  $\gamma$ -interferon.
- 25 27. Compound according to any one of Claims 1 to 17, for use in the treatment of diseases associated with, or characterized by, the presence of pro-

inflammatory cytokines such as  $\gamma$ -interferon, for example autoimmune, inflammatory or degenerative diseases such as multiple sclerosis, glomerulonephritis, Crohn's disease and rheumatoid arthritis.

- 5
28. Compound according to any one of Claims 1 to 17, for use in a treatment to supplement the immunosuppressive treatments used, for example, for preventing transplant rejection.
- 10
29. Medicament containing a compound according to any one of Claims 1 to 17.
- 15
30. Composition containing the compound according to any one of Claims 1 to 17 and a pharmaceutically acceptable vehicle, for use in the treatment of diseases associated with, or characterized by, the presence of pro-inflammatory cytokines such as  $\gamma$ -interferon, for example autoimmune or degenerative diseases such as multiple sclerosis, glomerulonephritis, Crohn's disease and rheumatoid arthritis.
- 20
31. Composition containing the compound according to any one of Claims 1 to 17 and a pharmaceutically acceptable vehicle, for use in a treatment to supplement the immunosuppressive treatments used, for example, to prevent transplant rejection.
- 25
32. Use of a compound according to any one of Claims 1 to 17, for preparing a medicament intended for the treatment of pathologies or conditions related to the activity, in particular excessive activity, of endogenous or exogenous  $\gamma$ -interferon.
- 30
- 35

33. Use of a compound according to any one of Claims 1 to 17, for preparing a medicament intended for the treatment of diseases associated with, or characterized by, the presence of pro-inflammatory cytokines such as  $\gamma$ -interferon, for example autoimmune, inflammatory or degenerative diseases such as multiple sclerosis, glomerulonephritis, Crohn's disease and rheumatoid arthritis.
34. Use of a compound according to any one of Claims 1 to 17, for preparing a medicament intended for a treatment to supplement the immunosuppressive treatments used, for example, for preventing transplant rejection.
35. Medicament containing  $\gamma$ -interferon in addition to a compound according to any one of Claims 1 to 17.
36. Medicament according to Claim 35, in which the compound according to any one of Claims 1 to 17 and the  $\gamma$ -interferon are in the form of a complex of the compound and of the  $\gamma$ -interferon.
37. Complex of a compound according to any one of Claims 1 to 17 and of  $\gamma$ -interferon, for use as a medicament.
38. Complex of a compound according to any one of Claims 1 to 17 and of  $\gamma$ -interferon, for use as an immunostimulant.
39. Complex of a compound according to any one of Claims 1 to 17 and of  $\gamma$ -interferon, for use in the treatment of a disease chosen from cancer, infectious,

for example viral, bacterial or parasitic, diseases,  
and organ fibroses.

- 5        40. Composition containing a complex of a compound  
according to any one of Claims 1 to 17 and of  $\gamma$ -  
interferon, and a pharmaceutically acceptable  
vehicle, for use in the treatment of a disease  
chosen from cancer, infectious, for example viral,  
10        bacterial or parasitic, diseases, and organ  
fibroses.
- 15        41. Medicament containing a complex of a compound  
according to any one of Claims 1 to 17 and of  $\gamma$ -  
interferon.
42. Use of a complex of a compound according to any  
one of Claims 1 to 17 and of  $\gamma$ -interferon, for  
preparing a medicament.
- 20        43. Use of a complex of a compound according to any  
one of Claims 1 to 17 and of  $\gamma$ -interferon, for  
preparing a medicament intended for the treatment  
of a given disease among cancer, infectious, for  
example, viral, bacterial or parasitic, diseases,  
25        and organ fibrosis.